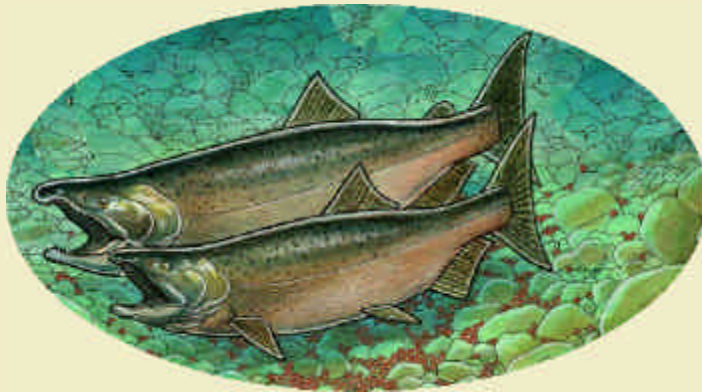


PATH

Plan for Analyzing and Testing Hypotheses

- Background
 - Snake River stocks listed in the 1990's due to their depressed status
 - History of competing models and conflicting management advice
 - Grew out of the 1993 legal finding that the federal government must reassess whether the hydrosystem jeopardizes the existence of endangered stocks
- Goal
 - Clarify differences among models and incorporate uncertainties into a formal biological decision analysis
 - Determine to what extent alternative hydrosystem actions prevent extinction and lead to recovery of Snake River chinook and steelhead



- Schedule
 - Comprehensive analysis of Snake River stocks completed in 1998. Follow up work continued into 1999
 - Comparing and contrasting PATH and CRI and experimental management currently underway (completion goal March 2000)

More information available at:

www.bpa.gov/environment/PATH

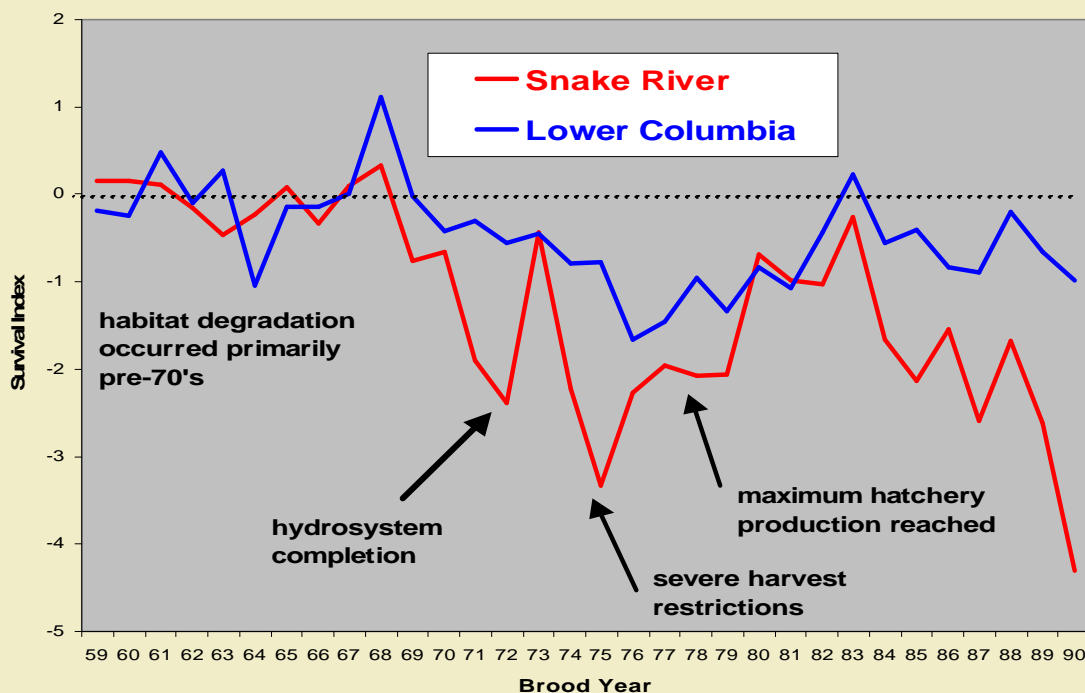
www.r1.fws.gov/CRFPO



Approach

1. PATH Retrospective Analyses – considering past data and trends

Evaluation of different hypotheses about how environmental factors affected past survival of various life stages of salmon and steelhead and their survival to adults.



•Declines in spring and summer chinook were greatest in the Snake River:

- Coincided with HYDROPOWER SYSTEM development and were greatest after 1974
- Occurred despite substantial cuts in harvest rates
- Occurred after habitat degradation
- Were not explained conclusively by climatic indices
- Were not explained conclusively by hatcheries.

Note: There are other hypotheses and scientific opinion that may explain historic patterns of decline for spring and summer chinook.



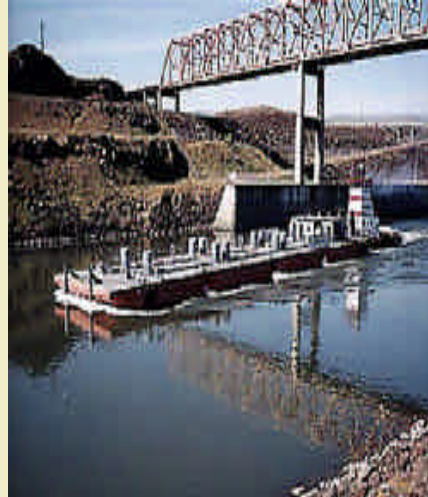
Approach

2. Prospective Analyses

Use a life cycle models to identify the hydropower options with the greatest chance of recovery and the least risk.



A1
Status Quo
Current Operation
of the Hydrosystem



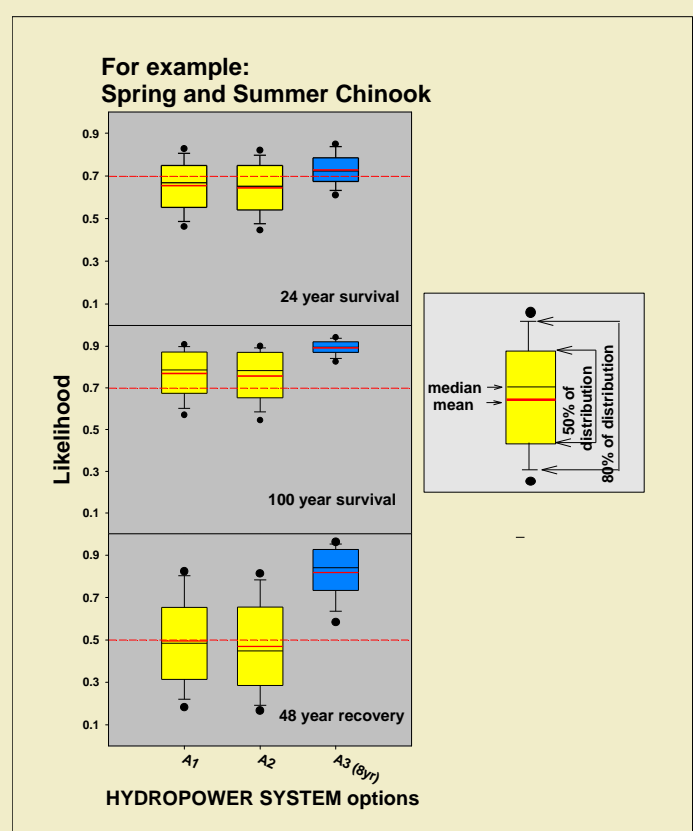
A2
Maximizing
transportation of fish
around the dams



A3
Dam Breach
Lower Four Snake River
Dams

Results

- Only dam drawdown options exceed all three of the NMFS standards for survival and recovery
- Dam breach has the greatest probability of recovery and is the least risky
- Overall results are insensitive (the rank of options does not change) to changes in harvest, additional predation mortality (e.g. terns), and possible habitat changes



Critical Uncertainty- Delayed Mortality

Delayed mortality occurs after a fish leaves the hydrosystem but may be related to the stress of migrating through the hydrosystem or being transported around the hydrosystem.

Dam breach is the option most likely to recover endangered stocks unless delayed mortality is unrelated to hydrosystem experience and transported fish survive equally as well as in-river migrants after they leave the hydrosystem ($D=1$).

